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July 17, 1998

HAND DELIVERED

Paula H. Doughty
Kennecott Utah Copper Corporation
8315 West 3595 South
P.O. Box 6001
Magna, Utah 84044-6001

Re: Review of 1998 Update on Mining Activities Conducted under DOGM Permit Number M/035/002, (April 30, 1998 Version), Kennecott Utah Copper Company (KUCC), Bingham Canyon Mine, M/035/002, Salt Lake County, Utah

Dear Ms. Doughty:

Thank you for your timely submission of this update for mining activities at the Bingham Canyon Mine. Attached are the Division's review comments of this version of the update. The Division comments are listed under the same headings as the update document and follow the same narrative format of the document. Portions of the pertinent text from your submission are included in some review comments to assist interpretation of the comment. Other comments include blank lines to illustrate the type of additional information which may be appropriate to include.

Thank you for your continued cooperation to improve and update the Bingham Canyon large mine permit. Please contact me or Tony Gallegos if you have any questions regarding these review comments.

Sincerely,

D. Wayne Hedberg
Permit Supervisor
Minerals Regulatory Program

jb
Attachment: Division Review Comments, version 7/17/98
cc: Mary Ann Wright, Associate Director
bing7-98.let

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**REVIEW COMMENTS ON
KUCC'S 1998 UPDATE ON MINING ACTIVITIES
CONDUCTED UNDER DOGM PERMIT NUMBER M/035/002
FIRST DRAFT (received 4/30/98)**

last revision 7/17/98

Section 1.1 - 1978 Permit Contents & Requirements

Suggest including a copy of the original Mined Land Reclamation Contract as an appendix to this submission which would be referenced in this section of the text.

In particular, items 3, 4, 5 & 6 of the original Reclamation Contract are particularly relevant and should be used to preface this document. The original contract states under item 3:

The Board and Operator both agree that the operator will be obligated to expend a minimum average, excluding salaries, but not operating wages, of \$50,000 - 1978 dollars per year for each three (3) year period, in maintaining a program of experimentation and in the application of the best available technology toward rehabilitation of land associated with or affected by mining or processing operations.

Section 1.2 - Subsequent DOGM Permits

KUCC proposes that in areas of permit overlaps, the latest permit would have precedence over all NEW features in the overlap and the old permit would apply to all OLD features in this overlap area. This would require identification of each structure/facility/area within the overlap areas and would perpetuate "overlap" confusion in the future. This may or may not be the best solution. It may be easier to have a permit border based on processes or facilities which have a more logical separation and have no overlap. This could be interpreted as retroactive application of the rules in some instances. This approach would require negotiation between KUCC and the Division.

Suggest KUCC add a heading (permit number) for each paragraph briefly describing each subsequent permit. Descriptions of the permit splitting or transfer of permit areas should be included in each section (as it is for the M/035/011 section).

Detail maps of each overlap area would be helpful in identifying features within each overlap area. These maps would be needed to discuss allocation of features to one permit or another. Ideally, the final outcome would be permit areas adjacent to each other rather than overlapping.

KUCC refers to the exemption of the tailings pipeline. The why and when of this exemption should be discussed in the text and a copy of the original documents granting this exemption should be included in an appendix and referenced.

1.3 Other Permits Governing Mining Operations

KUCC mentions that the entire surface of the existing impoundment must be reclaimed and vegetated by 1/1/2004 according to the existing plan. Which "existing plan" does this refer to - the air quality plan?

A paragraph discusses the DWQ UPDES permit for surface water discharge. This paragraph mentions that the tailings impoundment groundwater discharge permit also requires that acid rock drainage geochemistry studies be conducted. KUCC should specify whether this applies to the existing impoundment, or expansion, or both; also specify when this went into effect and briefly describe the studies to be performed (column leach tests, pilot tests, humidity cells, etc.)

A paragraph describes the Army Corps of Engineers involvement. Please clarify or differentiate between their involvement with the existing tailings impoundment and the new tailings expansion.

A paragraph describes the Salt Lake County Health Department involvement. Please specify the purpose and location of the bioremediation pad. Please specify the type and location of the landfill at the tailings impoundment.

2.0 Current Operations

?-Vertically integrated? Explain what this means.

Was the tailings pipeline originally included in the Bingham Permit M/035/002?

2.1 Mine (M/035/002)

Describe typical bench width or range of bench widths in the pit.

2.1.1 Mining Operations and Equipment

Describe typical blasting agents used, typical size of blast rounds. Describe types of shovels used (diesel/electric). Describe types of dump trucks used (diesel/electric/trolley system, etc.). Describe method of ore identification and ore control (ore sampling and analysis?). Describe length of conveyor system for ore transportation. Is ore hauled by truck to the railroad reloading area (ore destined for the North Concentrator)? Describe length of rail haulage from the pit to the North Concentrator. Standard gauge railroad? Who owns the rail line? Explain what the large wash pad is used for and how the waste water is handled from washing. More information describing the mining support facilities will be needed for the reclamation plan/bond than given here. Such as building dimensions, type of construction, reinforced concrete,

overhead cranes. How are waste lubricants from the maintenance facilities handled? Describe the type of fuels and volumes stored at the fueling areas.

2.2 Mine Waste Storage (M/035/002)

Terminology - waste rock storage -vs- waste rock dumps. Is the waste material (overburden) really being "stored" or placed? Statement "All of these areas were already being used for waste rock storage in 1978." - should this be "All of these areas contained mine waste in 1978 and mine waste has continued to be placed in these areas.(?) What were the waste dump disturbed acreages in 1978 and what are they now? Provide the date the 600 acres at the east side waste rock area was reclaimed. Describe the tasks included in reclamation of this 600 acre area. The area used to manage leach water and meteoric water flows surrounding the disposal areas - disposal areas = waste dumps? = storage areas? Future waste rock to be placed in Bingham Canyon (rather than Bingham Canyon area). Waste rock is end dumped. Active dump faces may not exceed 1000 vertical feet or slope distance? What are the angles, heights and slope lengths of the inactive dump faces?

2.2.1 Leach Water Management

Describe how the leach water is applied and typical volumes and chemistry. Describe how the leach water is collected at the base of the dumps and how it is transferred to the Precipitation Plant. Is the precipitation plant considered part of the permit? Describe the existing ponds used in leach water management (location, storage capacity, liner system). The leach circuit is now managed as a zero discharge facility. Describe the leach water management system from 1978 to the date of the current UPDES permit for this facility. Describe when the extensive engineering and institutional controls were implemented and what these controls were. (Possibly addressed in next section?)

2.2.2 Groundwater and Surface Water Quality Protection

Provide the date KUCC installed the structures above and below the waste rock disposal areas. Does waste rock disposal = waste rock storage = waste rock dumps? Select the most descriptive term and be consistent. Describe the old, less efficient structures existing in 1978 which have now been replaced. Therefore, these old, less efficient structures were in place and in use until the date these newer structures were installed. Describe how the leach water is transported back to the Precipitation Plant. Describe how meteoric ARD from unleached areas on dumps is transported to the process water circuit and why. What is this meteoric ARD? Describe the collection area reporting to these water management structures. Describe segregation of the different types of waters (groundwater, leachate waters, surface waters).

Does the leach water flow through the collection tunnel or in pipes within the tunnel?

Does this section describing the Dry Fork area need to be updated? - Was this entire project put on hold or just portions of the project? Is the tunnel still being extended up Dry Fork? Will the associated surface facilities be completed? Where is the 2000 acre feet of clean water being collected? Smaller *surface* water diversion structures

Describe the capacity of the large and small Bingham Reservoirs. What happens to the water collected in each of these reservoirs? Were these reservoirs in use in 1978? Were these reservoirs used for the same purpose in 1978 as they are now? What type of liner system did these reservoirs have in 1978? When were the new liner systems installed?

2.3 Excess Mine Process Water Disposal (M/035/002)

There are no *areas* currently being used for this activity as it was defined in the 1978 permit. How long was excess mine water directed to these ponds (19__ to 1985)? What type of liner system did these ponds have. 25 ponds within 1,200 acres - what was the acreage of ponds? Sludges consisted primarily of gypsum and contained measurable amounts of what other materials? Describe the reclamation performed at these ponds in 1995 under EPA supervision. What is the area being used for now and what features are there now?

2.4 Ore Transfer - Mine to Process (M/035/002, M/035/011)

The 1978 permit definition of ore transfer included the railroad and the conveyor systems - why was the conveyor from the in-pit crusher to the stockpile included in the Copperton Concentrator Permit M/035/011? Why not eliminate this area of overlap by including the conveyor in the Bingham Permit M/035/002.

Ore is transferred by rail 15 miles to the North Concentrator and KUCC maintains 90 miles of track. Explain where the 90 miles of track are located. The railroad network is largely the same as originally described in the 1978 permit(?) - was rail haulage still being used in the pit in 1978? Would moving the railroad maintenance facilities to Arthur be an amendment to the existing permit?

2.5 Ore Processing Facilities (M/035/002, M/035/011)

2.5.1 North Concentrator

"The existing concentrator has been operating since 1966 and is still operating as described in the 1978 Permit." - *The existing concentrator performs the same functions as it did in 1978.(?)* Be consistent with names - Bonneville Crushing/Grinding Plant -vs- Fine Crushing Plant or Grinding Plant. Describe the slurry pipeline from the North Concentrator to the Magna Flotation Plant (pipe diameter, type, length, location of pipeline corridor).

Describe how the concentrate is pumped to the Smelter (pipeline diameter, length, type, location). What happens to the water from dewatering (at the smelter)? Are tailings from the Magna Flotation Plant transported to the tailings impoundment in a pipeline separate from the main tailings pipeline? Please specify *existing* tailings impoundment.

2.5.2 Copperton Concentrator

Should include (M/035/011) in heading.

2.6 Tailings Storage (M/035/002, M/035/011, M/035/015)

As described in the 1978 Permit, tailings storage facilities include the Tailings Impoundment and tailings pipelines from the concentrators to the impoundment.

Tailings from the Copperton Concentrator are *currently* being transferred to the Tailings Impoundment via two thirteen mile long pipelines. *One pipeline was used to transport tailings from 19__ to 199_. The second pipeline was installed in ____ and was put into use on _____. The original pipeline was then taken out of use on _____. In addition to the tailings pipelines there are several additional pipelines running through this pipeline corridor. These other pipelines include: a ____ diameter line carrying ____ from ____ to ____ (address each additional pipeline).* The entire Copperton tailings pipeline system is regulated under Permit M/035/011. Explain why the pipeline system is regulated under M/035/011 when the 1978 M/035/002 permit included the tailings pipeline. Was the original pipeline in permit M/035/002? Explain how and why. If the tailings pipeline (s) are in permit M/035/011 then the second pipeline should have been a formal amendment to permit M/035/011(?).

The existing Tailings Impoundment and the facilities that The *Magna* tailings are pumped to the top of the embankment and released into the impoundment through a single point discharge located about 2,000 feet east of the Copperton single-point discharge. *Tailings were discharged into the Impoundment using these single-point discharge systems from 19__ to 19__ when the discharge system was modified to discharge tailings by ____ and _____. Current practice is to discharge tailings by ____ and ____ methods which provides for ____ and ____ (improved dust suppression & stability?)*

The existing impoundment has been receiving tailings since 1907 As the perimeter of the impoundment is raised The *outslopes of the embankment are ____ (drill/broadcast?) seeded with mixture of ____ and ____ as soon as possible after the dike raise to minimize dust and improve stability. Approximately __% of the existing tailings embankment or ____ acres, has been revegetated as of 1997. In addition to the seed mix described previously, the tailings embankment and stepback areas on the surface of the impoundment have received approximately*

_____ tree plantings which included the species of _____, _____, (etc.). KUCC has been implementing a tall tree program where _____ trees are planted and irrigated for the first _____ years until they are established. May not need to get into too much detail describing the reclamation of the tailings impoundment here, although it should address the concurrent reclamation which is part of the ongoing operations. Save a more detailed description of tailings reclamation for the updated Bingham Reclamation Plan.

A recent acid base accounting analysis of historical and modern tailings was performed in association with the proposed tailings expansion referred to as the North Impoundment permitted under M/035/015. Samples of historical and modern tailings indicate The excess of natural neutralization potential over acid generating potential in the tailings indicates that the risk of ARD for the whole tailings material within the impoundment is very low. The analyses indicate that 25 to 35% of the embankment for the North Impoundment has the potential to become acidic. The embankment of the existing impoundment has some isolated areas which are acidic. These areas are being treated by _____. KUCC will be performing ongoing characterization of the acid base potential of the tailings materials as part of permit M/035/015. This ongoing characterization includes _____.

Normally about half of the tailings are sent to the peripheral Describe the composition of the tailings - grain size, % solids, etc.

The existing Tailings Impoundment has almost reached its operational capacity It is being constructed on about 3200 acres immediately north and adjacent to the existing impoundment. *The embankment for the North Impoundment will utilize the north embankment of the existing impoundment as part of the expansion embankment. The embankment of the North Impoundment will be constructed utilizing an improved design which includes a drainage blanket to _____ and _____ and _____ to improve drainage of the tailings and increase embankment stability.*

2.7 Excess Process Water Disposal (M/035/002)

Do process water disposal facilities receive excess water from the tailings pond ONLY?

Three siphons installed to the clarification canal located at the base of the impoundment which flows Here the water is pumped from the canal to a holding reservoir with a capacity of _____ located _____, where it is returned

As much process water as possible All discharges are regulated under UPDES Permit Number UT0000051. *The UPDES permit limits the concentrations of the discharge water to ____ for ____, and ____ for ____, (etc.)*

All of the other facilities included under the excess process water disposal land use category in the 1978 permit are either closed or are only used by the Refinery and Smelter. Describe these closed facilities - location, acreage, how they were used, when they were closed, what their purpose/function is now.

2.8 Smelting, Refining and Power Generation (No DOGM Permits)

Describe the locations of these non-DOGM permit facilities in relation to the other permitted facilities. Describe any discharge of waters from these facilities into the permitted tailings facilities or excess process water facilities. Describe general acreage of these facilities. Describe other general surface features associated with each facility (i.e. slag pile, coal storage, etc.)

3.0 Recent Remediation and Reclamation Projects

Previously titled as Ongoing Reclamation Activities. Was all of the acreage under the table column of Reclaimed Acres within DOGM permit M/035/002? What is the total estimated disturbed area for M/035/002 to compare with the column Net Reclaimed Acres?

Move all reclamation activities performed under the EPA oversight to a separate paragraph. Explain which of these EPA oversight areas were within the permit area. Segregate the amount of money spent on these EPA oversight areas from the estimated \$250 million. Describe the time span (from 19__ to 199_) KUCC spent this \$250 million. Describe which sites were from historical mining/milling activities and which sites were related to KUCC's operations. Describe what is in each repository, the design of each repository and the reclamation of each repository.

For each of the subheadings (e.g. Butterfield Canyon Waste Rock and Sediments) state whether this is within the permit area and state whether this project is within DOGM jurisdiction. In the East Side Collection Systems describe where the tailings, sludges and metal contaminated soils originated. Which repository received these removed materials? Describe the reclamation treatments for the 900 acres reclaimed.

Describe where the biological water treatment pilot plant was built. Is this within the permit area? Should this have been included as a permit amendment? Why/ why not? Why was this plant constructed?

Describe where the membrane filtration pilot plant was built. Is this within the permit area? Should this be considered a permit amendment? Why/why not? Why was this plant constructed?

4.0 Future Mining Plans

Clarify that the SX/EW pilot plant was constructed in _____, 199_ and has been operated from ____ to _____. Describe the location of these facilities and any groundwater permits associated with these facilities (or why none are required). Describe the acreage and volume of ore leached. Describe the possible locations of low grade ore storage and the current probable use of this low grade ore. Describe the possible location of underground workings or surface access for the existing workings. (This information may be included in section 4.3?)

4.1 Pit Production Expansion

Stress that only the rate of production and expansion will be increasing.

4.2 Tailings Impoundment Transition and Closure

4.3 Low-Grade Ore Stockpiling and Pilot-Scale SXEW Facilities

Studies are being conducted The last sentence in this first paragraph is confusing and should be revised.

Comments regarding the SX/EW plant under 4.0 would apply to the last paragraph under this section.

4.4 Underground Mining